AMENDMENTS TO THE CLAIMS

Claim 1-32 **(canceled)**

33. **(currently amended)** A heat exchanger, comprising:
   a) a core having a stacking axis, a length extending along said stacking axis and a width extending perpendicular to said stacking axis;
   b) a plurality of first manifolds formed within said core ~~and~~ , each having a longitudinal axis extending said length;
   c) a plurality of second manifolds formed within said core ~~and~~ , each having a longitudinal axis extending said length, said plurality of second manifolds located alternatingly with said plurality of first manifolds across said width;
   d) a plurality of interconnecting channels formed within said core and spaced from one another along said length, each of said plurality of interconnecting channels having a first end fluidly communicating with one of said plurality of first manifolds and a second end fluidly communicating with at least one of said plurality of second manifolds; and
   e) a plurality of plates stacked along said stacking axis, each of said plurality of plates having a plurality of first apertures defining corresponding portions of said first manifolds and a plurality of second apertures defining corresponding portions of said second manifolds, at least some of said plates each having a plurality of spaces defining at least some of said plurality of interconnecting channels.

34. **(original)** A heat exchanger according to claim 33, wherein the number of said first manifolds in said core and the number of second manifolds in said core differ by one.

35. **(original)** A heat exchanger according to claim 34, wherein said second end of each of said interconnecting channels is in fluid communication with two of said second manifolds.

36. **(currently amended)** A heat exchanger, comprising:
   a) a core having a stacking axis and a length extending along said stacking axis;
   b) at least one first manifold formed within said core and having a longitudinal axis extending said length;
   c) a least one second manifold formed within said core and having a longitudinal axis extending said length;
   d) a plurality of interconnecting channels formed within said core and spaced from one another along said length, each of said plurality of interconnecting channels having a first

end fluidly communicating with said at least one first manifold and a second end fluidly communicating with said at least one second manifold;

e) a plurality of heat-exchanger plates each having a first aperture defining a portion of said at least one first manifold and a second aperture defining a portion of said at least one second manifold; and

f) a plurality of spacer plates stacked alternatingly with said plurality of heat-exchanger plates, each of said plurality of spacer plates having a third aperture defining a portion of said at least one first manifold, a fourth aperture defining a portion of said at least one second manifold and a space defining at least one of said interconnecting channels.

37. **(original)** A heat exchanger according to claim 36, wherein the number of said first manifolds in said core and the number of second manifolds in said core differ by one.

38. **(original)** A heat exchanger according to claim 37, wherein said second end of each of said interconnecting channels is in fluid communication with two of said second manifolds.

39. **(currently amended)** A method of forming a heat exchanger that includes a core having a length and a surface for engaging one of a heat source or a heat sink, comprising the steps of:

a) providing a plurality of plates forming the core;

b) forming each of said plurality of plates such that when said plurality of plates are stacked with one another along a stacking axis to form the core, said plurality of plates define within the core a first manifold having a longitudinal axis extending the length of the core, a second manifold having a longitudinal axis extending the length of the core, and a plurality of interconnecting channels spaced from one another along the length, each of said plurality of interconnecting channels having a first end fluidly communicating with said first manifold and a second end fluidly communicating with said second manifold; and

c) stacking said plurality of plates with one another along said stacking axis to form the core.

40. **(original)** A method of providing a heat exchanger having a heat-transfer surface with a heat-transfer capacity that varies over the heat-transfer surface, the heat exchanger having a stacking axis and the heat-transfer surface having a length extending along said stacking axis and a width extending perpendicular to said stacking axis, comprising the steps of:

a) forming a plurality of plates each having an edge defining a portion of the heat-transfer surface and each defining at least one interconnecting channel having a flow area such that at least some of said flow areas are different from rest of said flow areas; and

b) stacking said plurality of plates along the stacking axis.

41. **(new)** A heat exchanger configured to transfer heat between a body and a fluid having a flow, comprising:

a) an impervious heat transfer layer comprising a highly heat conductive material and defining a heat transfer interface adapted for thermally interfacing with the body;

b) a manifold region substantially coextensive with said impervious heat transfer layer and spaced from said impervious heat transfer layer opposite said heat transfer interface, said manifold region comprising a plurality of first manifolds and a plurality of second manifolds located alternatingly with said plurality of first manifolds, said first and second plurality of manifolds for containing the fluid;

c) a permeable heat transfer matrix comprising a highly heat conductive material, being substantially coextensive, and in thermal communication, with said impervious heat transfer layer and extending between said manifold region and said impervious heat transfer layer; and

d) a plurality of interconnecting channels defined within said permeable heat transfer matrix so as to fluidly connect ones of said plurality of first manifolds to ones of said plurality of second manifolds, said plurality of interconnecting channels operatively configured so that substantially all of the heat transferred between the body and the fluid occurs as the fluid flows toward, and substantially perpendicular to, said heat-transfer layer.

42. **(new)** A heat exchanger according to claim 41, further comprising:

a) a first end;

b) a second end spaced from said first end;

c) a first plenum, located proximate said first end, in fluid communication with said plurality of first manifolds; and

d) a second plenum, located proximate said second end, and in fluid communication with said plurality of second manifolds.

43. **(new)** A heat exchanger according to claim 41, wherein each one of said plurality of first manifolds and each one of said plurality of second manifolds has a substantially linear longitudinal axis and all of said longitudinal axes are parallel to one another, the heat exchanger further comprising a stacking axis parallel to each of said longitudinal axes and a plurality of plates stacked along said stacking axis, said plurality of plates defining said plurality of first manifolds, said plurality of second manifolds and said plurality of interconnecting channels.

44. **(new)** A heat exchanger according to claim 43, wherein said plurality of plates comprises a plurality of heat-exchanger plates each having at least one fin separating adjacent ones of said plurality of interconnecting channels.

45. **(new)** A heat exchanger according to claim 44, wherein said plurality of plates includes a plurality of spacer plates located alternatingly with said plurality of heat-exchanger plates, each of said spacer plates defining at least a portion of each one of said plurality of interconnecting channels.

46. **(new)** A heat exchanger according to claim 41, wherein said heat-transfer interface has a heat-transfer capacity that varies over said heat-transfer interface and each of said plurality of interconnecting channels has a flow restriction wherein at least some of said flow restrictions are different from others of said flow restrictions to vary said heat transfer capacity.

47. **(new)** A heat exchanger configured to transfer heat between a body and a fluid having a flow, comprising:

a) an impervious heat transfer layer comprising a highly heat conductive material and defining a heat transfer interface adapted for thermally interfacing with the body;

b) a manifold region substantially coextensive with said impervious heat transfer layer and spaced from said impervious heat transfer layer opposite said heat transfer interface, said manifold region comprising a plurality of first manifolds and a plurality of second manifolds located alternatingly with said plurality of first manifolds, said first and second plurality of manifolds for containing the fluid;

c) a permeable heat transfer matrix comprising a highly heat conductive material, being substantially coextensive, and in thermal communication, with said impervious heat transfer layer and extending between said manifold region and said impervious heat transfer layer; and

d) a plurality of interconnecting channels defined within said permeable heat transfer matrix so as to fluidly connect ones of said plurality of first manifolds to ones of said plurality of second manifolds, said plurality of interconnecting channels defining a plurality of heat transfer structures located between adjacent ones of said plurality of interconnecting channels, each of said plurality of heat transfer structures being in thermal communication with said heat transfer layer and including at least one heat transfer surface disposed substantially perpendicular to said heat transfer layer, said at least one heat-transfer surface having an area exposed to at least one interconnecting channel of said plurality of interconnecting channels and selected so that substantially all of the heat transferred between said heat transfer layer and the fluid occurs via said heat transfer surfaces of said plurality of heat transfer structures as the fluid flows toward said heat transfer interface in a direction substantially perpendicular to said heat transfer interface.

48. **(new)** An assembly, comprising:

a) a heat exchanger utilizing a working fluid having a flow, comprising:

i) an impervious heat transfer layer comprising a highly heat conductive material and defining a heat transfer interface;

ii) a manifold region substantially coextensive with said impervious heat transfer layer and spaced from said impervious heat transfer layer opposite said heat transfer interface, said manifold region comprising a plurality of first manifolds and a plurality of second manifolds located alternatingly with said plurality of first manifolds, said first and second plurality of manifolds for containing the fluid;

iii) a permeable heat transfer matrix comprising a highly heat conductive material, being substantially coextensive, and in thermal communication, with said impervious heat transfer layer and extending between said manifold region and said impervious heat transfer layer; and

iv) a plurality of interconnecting channels defined within said permeable heat transfer matrix so as to fluidly connect ones of said plurality of first manifolds to ones of said plurality of second manifolds, said plurality of interconnecting channels operatively configured so that substantially all of the heat transferred between the body and the fluid occurs as the fluid flows toward, and substantially perpendicular to, said heat-transfer layer; and

b) a device in thermal communication with said heat-transfer interface.

49. **(new)** An apparatus according to claim 48, wherein said device is a microelectronic device.

50. **(new)** An apparatus according to claim 49, wherein said microelectronic device is a microprocessor.

51. **(new)** An apparatus according to claim 48, further comprising a fluid re-circulation system in fluid communication with said plurality of first manifolds and said plurality of second manifolds.

52. **(new)** A heat exchanger configured to transfer heat between a body and a fluid having a flow, comprising:

a) an impervious heat transfer layer comprising a highly heat conductive material and defining a heat transfer interface adapted for thermally interfacing with the body;

b) a manifold region substantially coextensive with said impervious heat transfer layer and spaced from said impervious heat transfer layer opposite said heat transfer interface, said manifold region comprising a plurality of first manifolds and a plurality of second manifolds located alternatingly with said plurality of first manifolds, said first and second plurality of manifolds for containing the fluid and having longitudinal axes parallel to one another and said impervious heat-transfer layer;

c) a permeable heat transfer matrix comprising a highly heat conductive material, being substantially coextensive, and in thermal communication, with said impervious heat transfer layer and extending between said manifold region and said impervious heat transfer layer;

d) a plurality of interconnecting channels defined within said permeable heat transfer matrix so as to fluidly connect ones of said plurality of first manifolds to ones of said plurality of second manifolds, said plurality of interconnecting channels operatively configured so that substantially all of the heat transferred between the body and the fluid occurs as the fluid flows toward, and substantially perpendicular to, said heat-transfer layer; and

e) a plurality of plates stacked along a stacking axis that is parallel to each one of said plurality of longitudinal axes, said plurality of plates defining said plurality of first manifolds, said plurality of second manifolds and said plurality of interconnecting channels.

53. **(new)** A heat exchanger according to claim 52, further comprising:

a) a first end;

b) a second end spaced from said first end;

c) a first plenum, located proximate said first end, in fluid communication with said plurality of first manifolds; and

d) a second plenum, located proximate said second end, and in fluid communication with said plurality of second manifolds.

54. **(new)** A heat exchanger according to claim 52, wherein said plurality of plates comprises a plurality of heat-exchanger plates each having at least one fin separating adjacent ones of said plurality of interconnecting channels.

55. **(new)** A heat exchanger according to claim 54 wherein said plurality of plates includes a plurality of spacer plates located alternatingly with said plurality of heat-exchanger plates, each of said spacer plates defining at least a portion of each one of said plurality of interconnecting channels.

56. **(new)** A heat exchanger according to claim 52, wherein said heat-transfer interface has a heat-transfer capacity that varies over said heat-transfer interface and each of said plurality of interconnecting channels has a flow restriction wherein at least some of said flow restrictions are different from others of said flow restrictions to vary said heat transfer capacity.

57. **(new)** A heat exchanger configured to transfer heat between a body and a fluid having a flow, comprising:

a) an impervious heat transfer layer comprising a highly heat conductive material and defining a heat transfer interface adapted for thermally interfacing with the body;

b) a manifold region substantially coextensive with said impervious heat transfer layer and spaced from said impervious heat transfer layer opposite said heat transfer interface, said manifold region comprising a plurality of first manifolds and a plurality of second manifolds located alternatingly with said plurality of first manifolds, said first and second plurality of manifolds for containing the fluid and having longitudinal axes parallel to one another and said impervious heat-transfer layer;

c) a permeable heat transfer matrix comprising a highly heat conductive material, being substantially coextensive, and in thermal communication, with said impervious heat transfer layer and extending between said manifold region and said impervious heat transfer layer;

d) a plurality of interconnecting channels defined within said permeable heat transfer matrix so as to fluidly connect ones of said plurality of first manifolds to ones of said plurality of second manifolds, said plurality of interconnecting channels defining a plurality of heat transfer structures located between adjacent ones of said plurality of interconnecting channels, each of said plurality of heat transfer structures being in thermal communication with said heat transfer layer and including at least one heat transfer surface disposed substantially perpendicular to said heat transfer layer, said at least one heat-transfer surface having an area exposed to at least one interconnecting channel of said plurality of interconnecting channels and selected so that substantially all of the heat transferred between said heat transfer layer and the fluid occurs via said heat transfer surfaces of said plurality of heat transfer structures as the fluid flows toward said heat transfer interface in a direction substantially perpendicular to said heat transfer interface; and

e) a plurality of plates stacked along a stacking axis that is parallel to each one of said plurality of longitudinal axes, said plurality of plates defining said plurality of first manifolds, said plurality of second manifolds and said plurality of interconnecting channels.

58. **(new)** An assembly, comprising:

a) a heat exchanger utilizing a working fluid having a flow, comprising:

i) an impervious heat transfer layer comprising a highly heat conductive material and defining a heat transfer interface adapted for thermally interfacing with the body;

ii) a manifold region substantially coextensive with said impervious heat transfer layer and spaced from said impervious heat transfer layer opposite said heat transfer interface, said manifold region comprising a plurality of first manifolds and a plurality of second manifolds located alternatingly with said plurality of first manifolds, said first and second plurality of manifolds for containing the fluid and having longitudinal axes parallel to one another and said impervious heat-transfer layer;

iii) a permeable heat transfer matrix comprising a highly heat conductive material, being substantially coextensive, and in thermal communication, with said impervious heat transfer layer and extending between said manifold region and said impervious heat transfer layer;

iv) a plurality of interconnecting channels defined within said permeable heat transfer matrix so as to fluidly connect ones of said plurality of first manifolds to ones of said plurality of second manifolds, said plurality of interconnecting channels operatively configured so that substantially all of the heat transferred between the body and the fluid occurs as the fluid flows toward, and substantially perpendicular to, said heat-transfer layer; and

v) a plurality of plates stacked along a stacking axis that is parallel to each one of said plurality of longitudinal axes, said plurality of plates defining said plurality of first manifolds, said plurality of second manifolds and said plurality of interconnecting channels; and

b) a device in thermal communication with said heat-transfer interface.

59. **(new)** An assembly according to claim 58, wherein said device is a microelectronic device.

60. **(new)** An assembly according to claim 59, wherein said microelectronic device is a microprocessor.

61. **(new)** An assembly according to claim 58, further comprising a fluid re-circulation system in fluid communication with said plurality of first manifolds and said plurality of second manifolds.

62. **(new)** An assembly according to claim 58, wherein said device is a second heat exchanger according to claim 58, thereby effecting heat exchange between said working fluid and another fluid.

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